

Tropical Areas of Interest Discussion for August 15, 2010

Created 1600 UTC August 14, 2010

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Summary: Today is another No-Fly Day for all GRIP aircraft, but the tropics are growing more interesting today. A cold front diving south of 30N is producing widespread showers and thunderstorms, with good Okubo-Weiss values that the Predict team is sampling in a shake-down flight today. A large SAL outbreak is dominating the central Atlantic, and the tropical wave associated with PGI-27L has much better convection associated with it today than yesterday as it approaches the Windward Islands, and will continue to be monitored. Other potentially interesting future targets include ex-TD05 which is expected to begin to re-intensify as it re-emerges into the Gulf of Mexico tomorrow, as well as many global models continuing to forecast cyclogenesis for PGI-30L after it emerges from Africa tomorrow. The DC-8 is looking at potentially flying Tuesday Aug 17 to investigate what will happen to ex-TD05 when it is back over the Gulf of Mexico, however the current track forecast may have it back over land by the time the DC-8 is ready to fly this system. The spread of possible tracks varies on how long it will remain over the Gulf, however the system is expected to remain very close to the coast as it tracks westward to Louisiana.

Forecast for 1600 UTC 8/15/2010:

Synoptic Overview:

The tropical Atlantic Basin is growing more interesting today. There are several surface features of note (**1**), a couple of upper level features, and a SAL outbreak across the central Atlantic. There is a surface 1016 hPa High in the Gulf of Mexico just West of Florida, and a stationary front positioned from the coast of the Georgia extending down to near 27N at 70W and extending back northeast. This feature has a lot of good convection associated with it and good Okubo-Weiss values so it is a flight target for the Predict G-V today. The western edge of this front has also greatly impacted the forecast track of ex-TD05/PGI-29L. There is currently a good upper level anticyclone over the top of the main convection associated with ex-TD05 (**4a**), which is mainly south of the coast of FL, AL, and MS. The center of PGI-29L/ex-TD05 is currently located over SW Georgia. There are four tropical waves. The first is positioned along 95W between 9N and 22N and has scattered convection from Guatemala through the Bay of Campeche. A second tropical wave is located near 76W south of 19N, with satellite winds indicating a cyclonic curvature, but without organized convection. A third tropical wave extends out of the ITCZ approaching the Windward Islands 9N/46W to 19N/53W, and is associated with PGI-27L. Today there is more convection associated with this wave than there had been previously. A fourth tropical wave is along the west coast of Africa between 9N and 22N associated with a 1009 hPa low. There is also an analyzed pouch named PGI-30L and many of the models (ECMWF, GFS, NOGAPS, NCEP Ensemble, etc.) are continuing to forecast development for this system after it emerges from Africa (**11**),

however the phase speeds in the models vary on this. This system will continue to be monitored.

Features of Interest:

PGI-29L/Ex-TD5 is located over southern Alabama/Georgia. The vorticity maximum associated with Ex-TD5 has been clearly tracked at low- and mid-levels since emerging from the Gulf (4b). IR satellite imagery (2) indicates mostly warm-topped cloud over south Georgia with little precipitation according to radar. The best convection is moving south of the Gulf coast (5) with radar echoes up to 50-55 dBZ. An upper-level anticyclone has built over the southeastern U.S., which will drive steering flow towards the south, as expected over the past few days, which will result in the emergence of the disturbance associated with ex-TD5 into the Gulf in the next day. The most intense vorticity maximum is located at 700 hPa (3). The consensus forecast track is as follows: 16/0200UTC: 84.8W/30.2N; 16/1400UTC: 86.2W/29.1N; 17/0200UTC: 87.9W/28.7N; 17/1400UTC: 90.1W/29.1N; 18/0200UTC: 91.5W/29.8N; 18/1400UTC: 91.8W/30.8N; 19/0200UTC: 91.8W/31.3N; 19/1400UTC: 91.9W/32.1N. The disturbance is of interest to a possible DC-8 mission on Tuesday. The current Ocean Heat Content map (6) shows that the potential track of this system will take it directly over a heat content maximum in the Northern Gulf of Mexico, which could aid any rapid development chances for this system in the short time it will be over water again.

SAL/DUST:

The dust plume which moved from west Africa on 8/11 is still creating high aerosol optical thicknesses over the east Atlantic. (8) The dusty airmass now extends to nearly 45W and is present from 10N to 32N. A secondary dust surge was exiting West Africa this morning, coincident with a surge in total precipitable water associated with the broad trough behind PGI-28L. (7) There is still a slightly elevated aerosol optical thickness feature extending from 50W/17N SE to 42W/10N. (8) The eastern and central Atlantic are still quite dry, (7) however the surge in moisture leaving west Africa will likely spread eastward as moderate easterly winds are present in the east Atlantic at low to mid levels.

PGI-27L is currently located near the northern end of an easterly wave at 52W/17N (1,3). A small burst of shallow convection this morning was near the northern end of the wave (2), but the rest is quiet with little evidence of cyclonic flow in the visible imagery (not shown). There appears to be a small surge of moisture which was not present yesterday, but the wave is still very dry. (7) AIRS soundings suggest that the convectively active area near PGI-27L is saturated near the surface but very quickly becomes dry at the mid-levels. (not shown) As mentioned above, some low dust content appears to still be present with this wave as well. The AOT levels are not significantly above typical continental values of 0.3 to 0.4 however, so major microphysical impact on any convection is unlikely.

Forecast for PGI-27L:

The major global models are in good agreement predicting the track of PGI-27L straight westward across the lesser Antilles and into the Caribbean. None of the models amplify

the embedded vortex significantly, but a weak vorticity maxima at 700 hPa is tracked for 96 hours in ECMWF, GFS and NOGAPS. PGI-27L is currently in a low shear (less than 10 kts) environment with westerly shear from an upper level anticyclone to its southwest. The NCEP ensemble suite is predicting an upper level low to drop southwestward from the central atlantic by 0000 UTC on 8/17 **(10)**. This low is forecast to follow behind and to the north of PGI-27L, keeping westerly shear over any possible vortex. While the shear values will likely remain below 12-15 kts over the system, the model forecasts and the lack of significant convection suggest that PGI-27L will not develop into a tropical cyclone in the next 48 hours. The movement into a more moist environment as it crosses the Antilles is encouraging, and PGI-27L should continued to be monitored.

PGI28L became well defined on 8/9 0000 UTC near 15E. Over the last 24 hr the westward motion of the system has slowed and it has moved north in association with a weakness in the East Atlantic mid-level ridge **(9)**. The disturbance is currently associated with a dry, non-convective, strip of vorticity which extends from 12N/30W to 22N/18W. The elongated nature of the disturbance is associated with deformation related to the strong northeasterly flow to the northwest. The GFS and ECMWF are no longer able to coherently track this system in the forecasts as it becomes increasingly deformed and weakened. Some piece of this vorticity may become incorporated into a mid-level trough which is centered at 22N/32W at 8/16 1200 UTC, 22N/40W at 8/17 1200 UTC, and 21N/46W at 8/18 1200 UTC in the GFS forecast. While for the next 48 hr this trough will be experiencing very dry air and the GFS is forecasting limited convection. Beyond this time convection begins to increase, especially on the SE side of the system although the system remains weak.

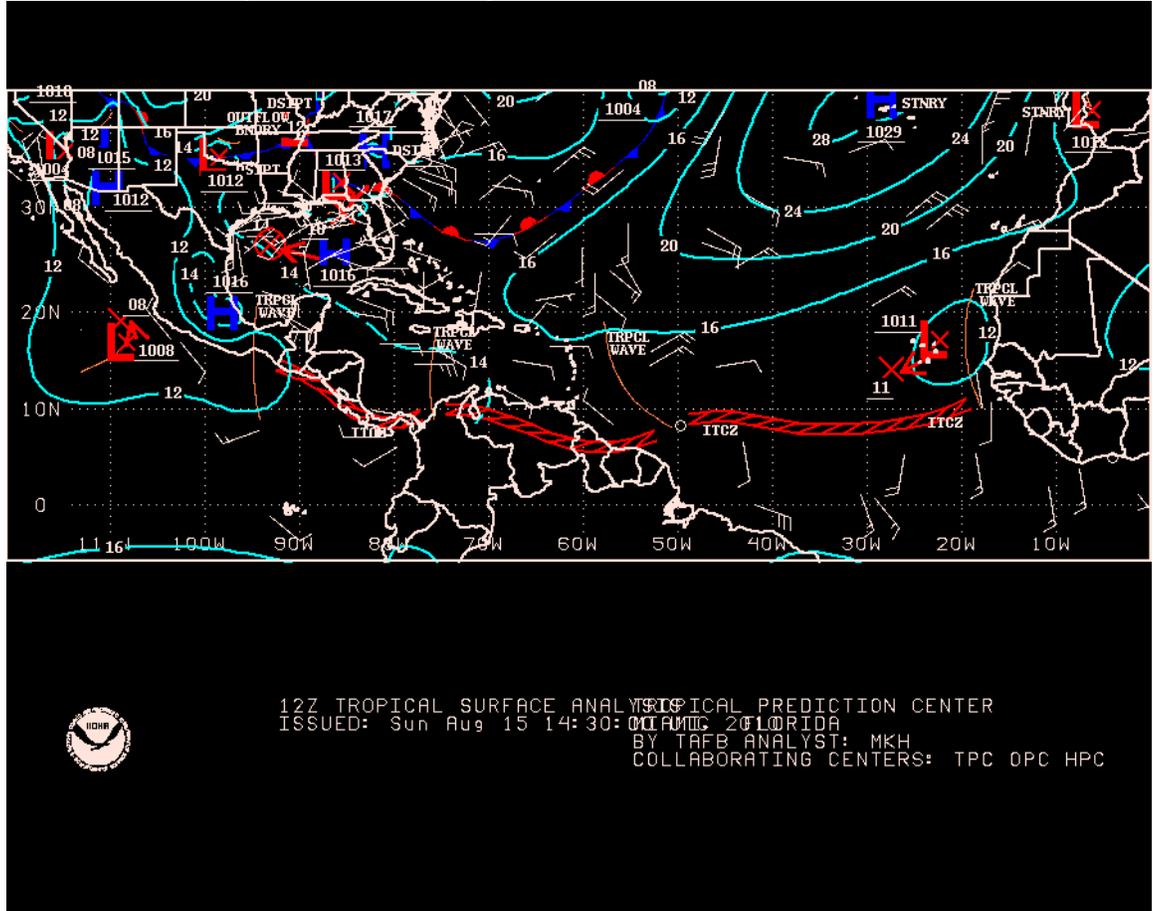
PGI-30L is currently over West Africa. A hovmoller diagram of the 700 hPa vorticity shows a weak, sometimes-difficult-to-track disturbance, forming at 8/11 0000 UTC at 30E and moving westwards until today. Currently there are two 850 hPa vorticity maxima in the CIMSS product which may play a role in the future evolution of this system should it become more developed and better defined over the Atlantic over the next 48 hr. The first disturbance is located at 12N/7W at 8/15 1200 UTC a second disturbance is indicated by a vorticity maxima located at 10N/20W; both have an intensity of $5 \times 10^{-5} \text{ s}^{-1}$ **(11)**. At 8/15 0600 UTC the 700 hPa vorticity and 315K potential vorticity in the GFS analyses is enhanced in an east-west band at 10N from 40W to 20W and 10W to 10E. The break in the east-west extent of the mid-level PV/vorticity strip and mid-level easterly jet is associated with the northward moving dissipating PGI28L. The oceanic strip of vorticity has had a large amount of convection occurring over the last 48 hr. Convection associated with the disturbance over Africa has been highly modulated by the diurnal cycle with a large MCS moving from Burkina Faso into Mali last afternoon into the early evening. Although as of 1200 UTC there was not a significant amount of deep convection associated with PGI30L a new convective system may develop during the afternoon into evening hours.

The GFS and other global models are forecasting that the 850 hPa vortex over Africa which has been identified as PGI30L will interact with the enhanced vorticity and convection in the ITCZ as it moves westward. The low-level vorticity maxima currently over Africa is forecast to take a WNW track reaching the coast by 8/17 0600 UTC **(11)**.

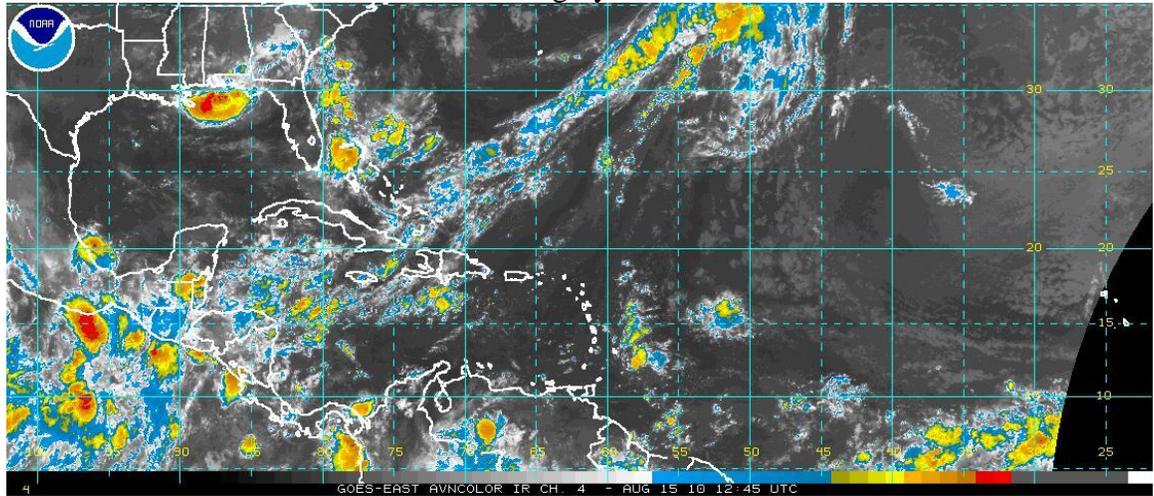
This disturbance is forecast to continue moving westward and may wrap up the enhanced vorticity currently in the oceanic ITCZ by 8/18 0600 UTC. The continued development of this disturbance is suggested by many global models (GEOS-5, GFS, NOGAPS, and ECMWF) beyond 72hr (11). Considerable uncertainty still exists in the timing of tropical cyclogenesis, as the disturbance still has not moved into the Atlantic and has not become particularly coherent.

Static Images used in discussion:

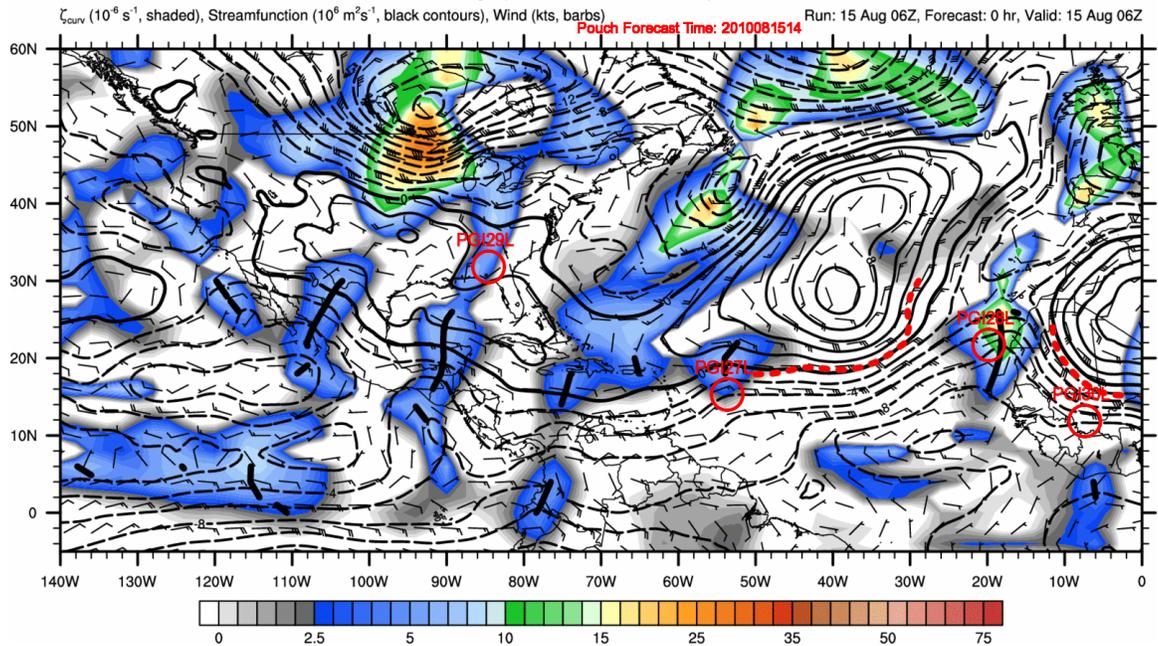
- 1) OPC Surface Analysis 1200 UTC Aug 15, 2010



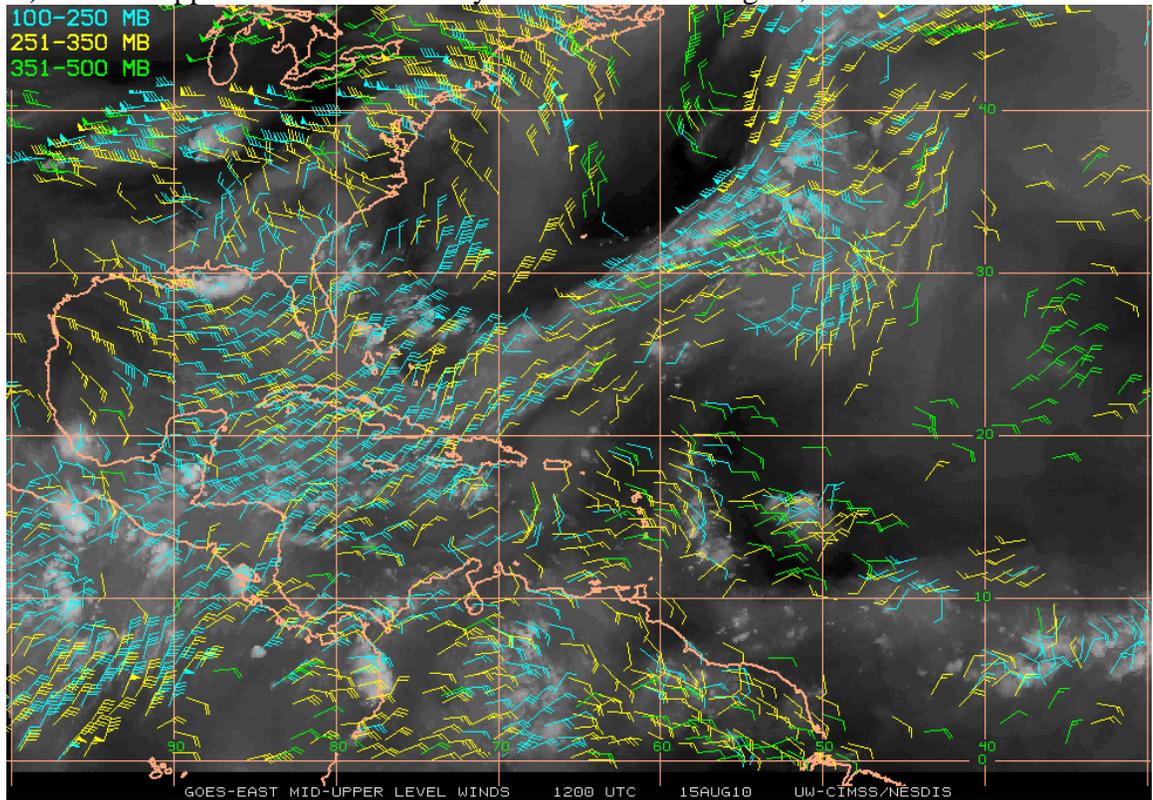
2) Atlantic Basin Wide View IR Satellite Imagery at 12:45 UTC



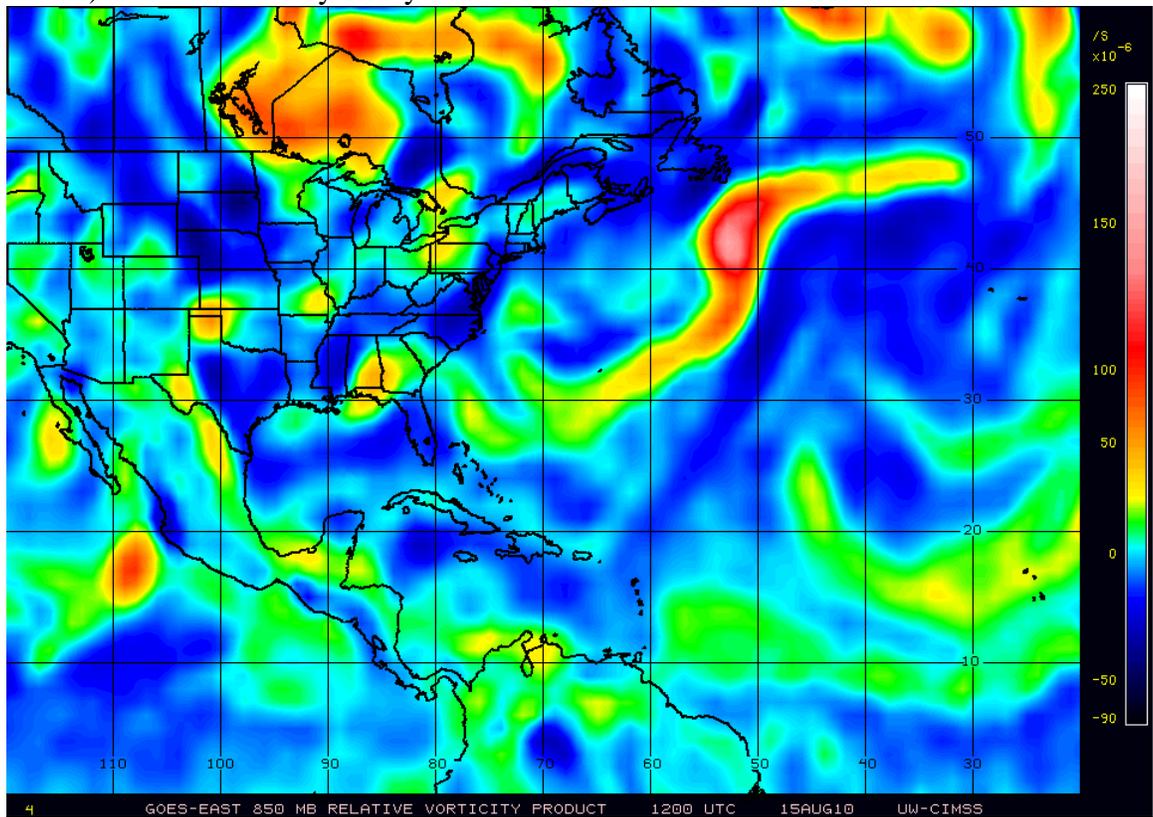
3) Montgomery Site Pouch Tracking 0000 UTC Aug 15, 2010. Locations of pouch identified on 700 hPa surface by Curvature vorticity, streamfunction, and winds.
700 hPa Curvature Vorticity (Reduced to 2.5°), Streamfunction, and Wind



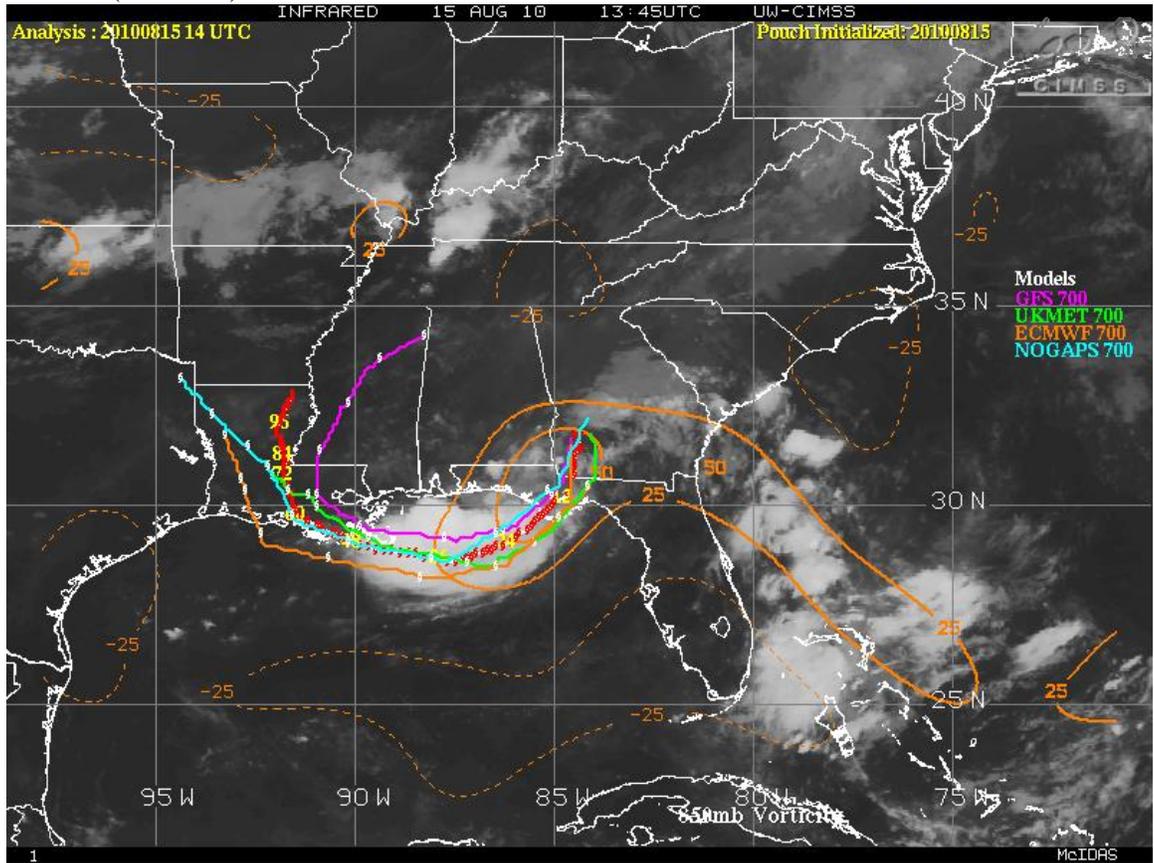
4) A) CIMSS Upper Level Winds Analysis at 1200 UTC Aug 15, 2010



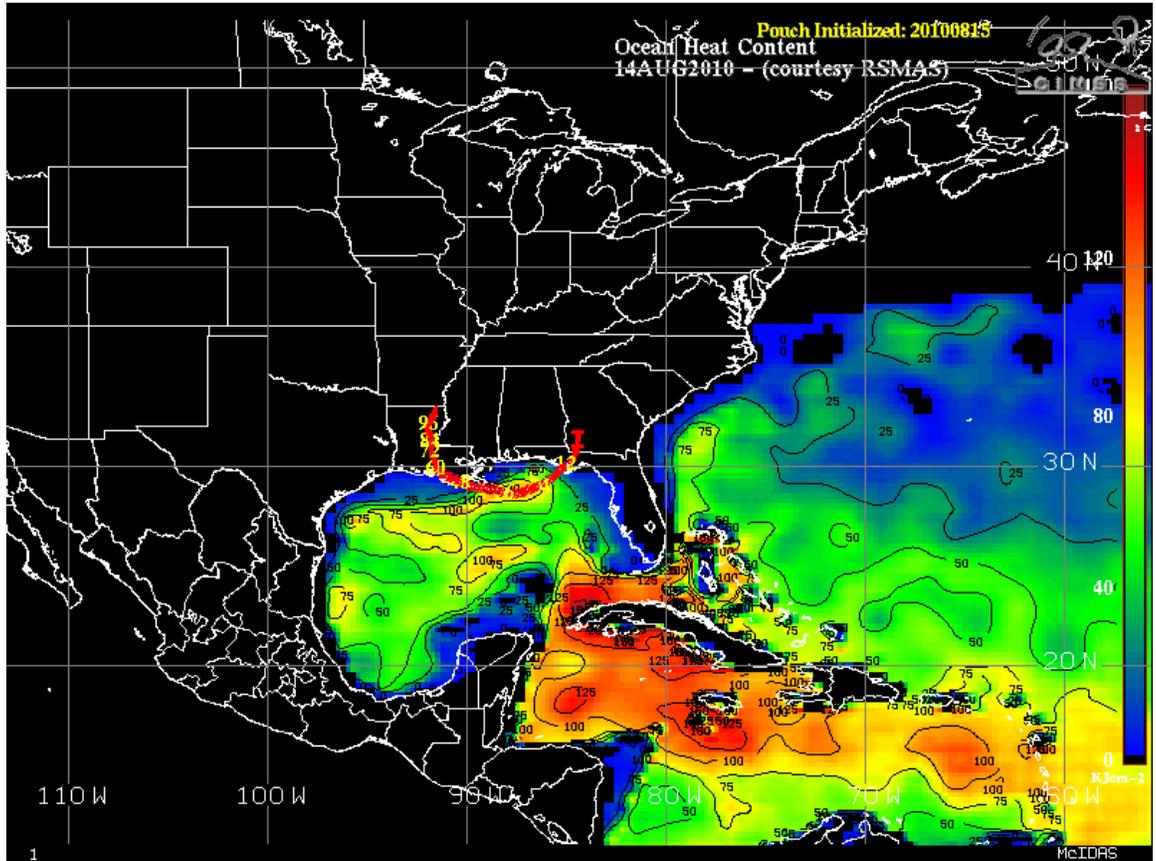
and B) 850 hPa Vorticity Analysis at 1200 UTC:



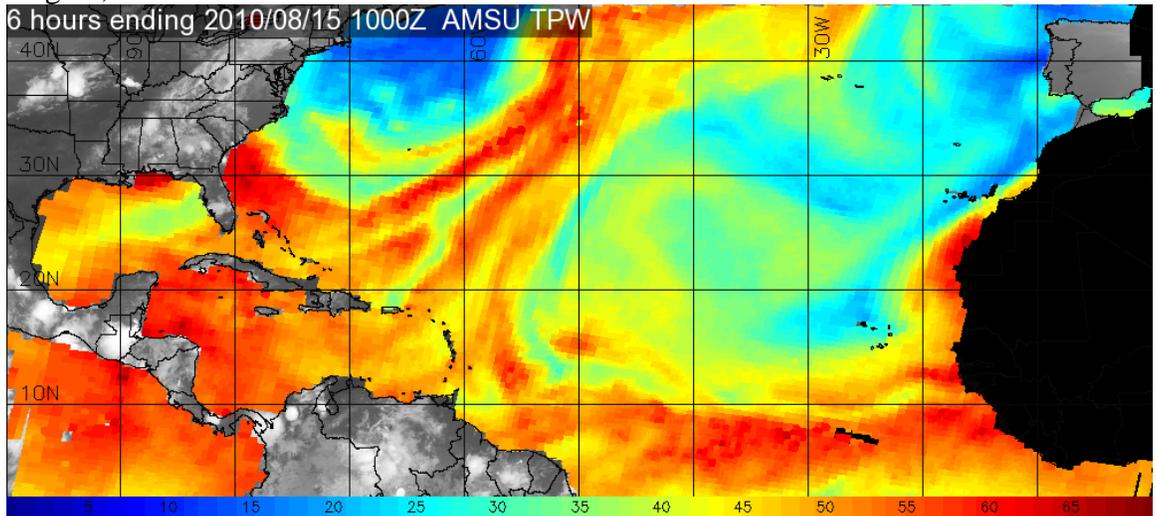
- 5) Model Consensus Pouch Forecast for PGI-29L(initialized 0000 UTC Aug 15, 2010) overlain with Water Vapor Imagery and 850 hPa vorticity analysis from CIMSS (contours) at 13:45 UTC:



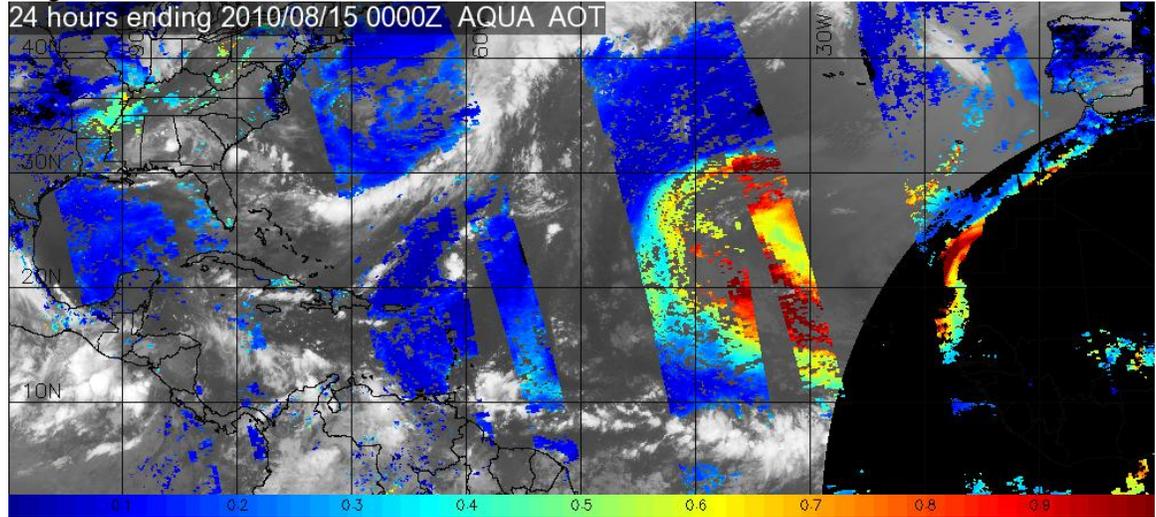
- 6) Ocean Heat Content overlaid on the forecast consensus track for PGI-29L:



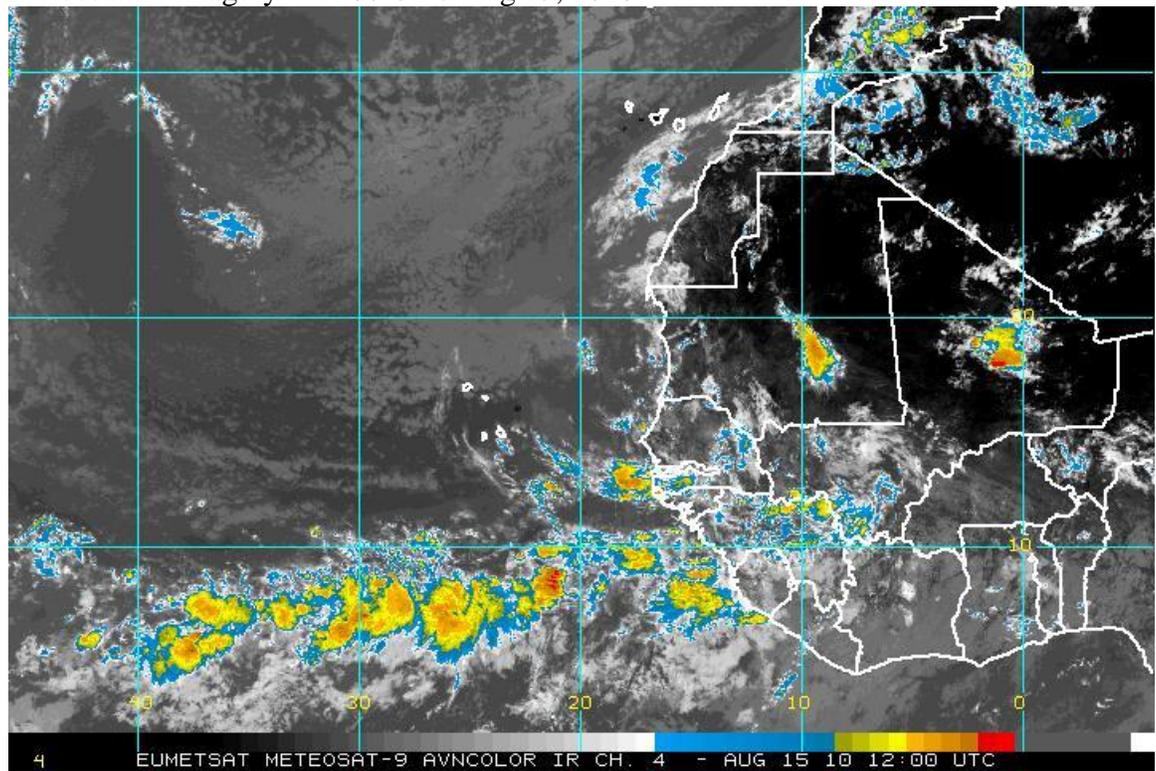
- 7) AMSU TPW 6-hr Composite Imagery from JPL "SGRIP" site ending 1000 UTC Aug 15, 2010



- 8) AQUA AOT 24-hr composite imagery from JPL "SGRIP" site ending 0000 UTC Aug 15, 2010

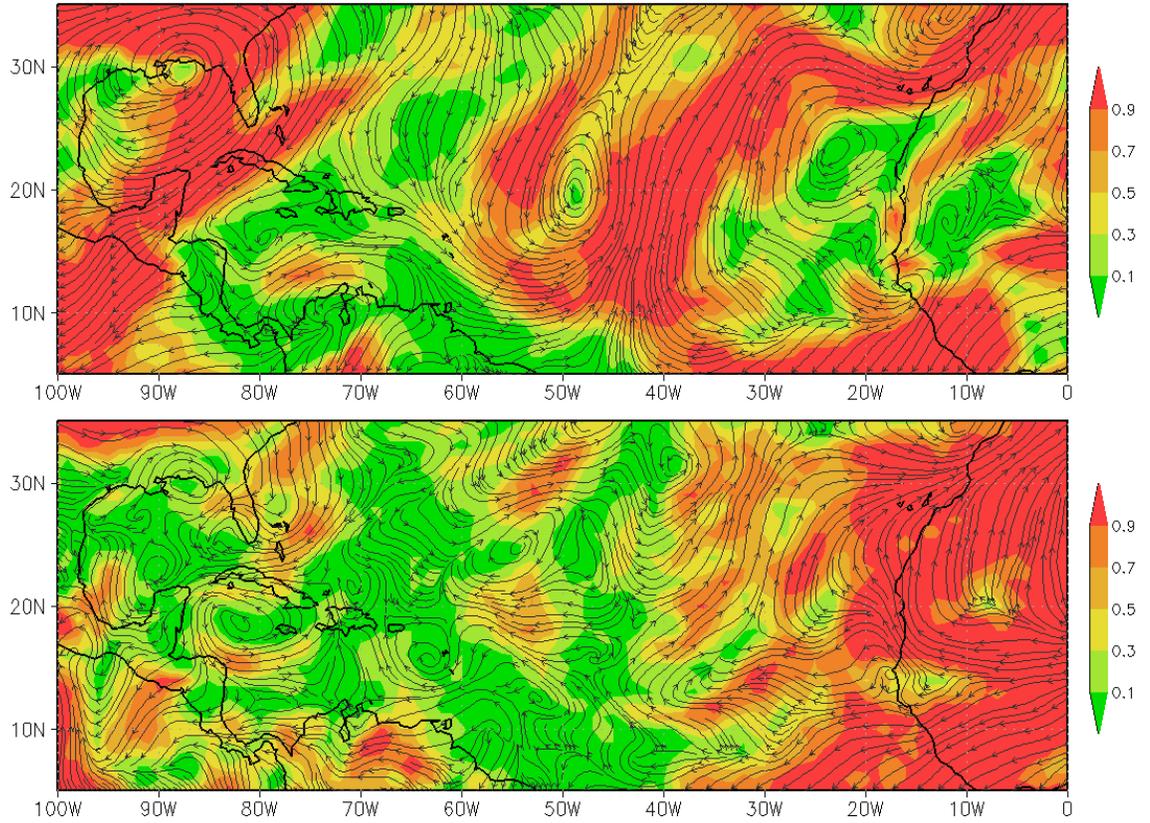


- 9) Meteosat IR Imagery at 1200 UTC Aug 15, 2010:



10) NCEP Ensemble Shear Probabilities at 48 hours from 0000 UTC initialization on Aug 15, 2010, for 200-850 hPa and 500-850 hPa Wind Shear: Probability of exceedance of critical values.

Gray: NCEP 48-hour mean streamlines of (TOP) 200-850 and (BOTTOM) 500-850 hPa shear. 20 members.
Shading: TOP: Prob(Shear > 10 m/s). BOTTOM: Prob(Shear > 5 m/s). Init. 2010081500, Valid 2010081700.



- 11) CIMSS Predict Support Site image of PGI-30L on Meteosat IR image from 12:30 UTC Aug 15, 2010 with 4 global model forecast track positions and 850 hPa Vorticity Analysis at 1200 UTC Aug 15, 2010.

